

Claims

- [c1] 1. A real-time data transmission interface suitable for transmitting a nonreal-time data in real-time and transmitting a real-time data in nonreal-time, and the real-time data transmission interface comprising:
a nonreal-time data interface unit for receiving/transmitting the nonreal-time data;
an I/O unit coupled to the nonreal-time data interface unit and being used as a transmission interface for the nonreal-time data and the real-time data;
a memory unit coupled to the I/O unit for caching the nonreal-time data and the real-time data; and
a network interface control unit coupled to the memory unit for receiving/transmitting the real-time data.
- [c2] 2. The real-time data transmission interface of claim 1, wherein the nonreal-time data interface unit comprises:
a bus interface unit working as an interface for inputting/outputting the nonreal-time data;
a data output latch coupled to the bus interface unit via an internal data bus, wherein the data output latch is a latch for latching a data transmitted by the nonreal-time data interface unit to other units;

a data input latch coupled to the bus interface unit via the internal data bus, wherein the data input latch is a latch for latching a data transmitted by the other unit and received by the nonreal-time data interface unit;
a control signal latch coupled to the bus interface unit via the internal data bus, wherein the data output latch is a latch for latching a control signal transmitted by the nonreal-time data interface unit to other units;
a buffer coupled to the bus interface unit via the internal data bus; and
a flag register coupled to the buffer for storing a flag state.

[c3] 3. The real-time data transmission interface of claim 2, wherein the buffer comprises a 3-state (tri-state) buffer, when the flag state in the flag register is being setting/reading, the 3-state buffer is in an "on" state, while when the flag state is not being setting/reading, and the 3-state buffer is in a high impedance state.

[c4] 4. The real-time data transmission interface of claim 2, wherein the nonreal-time data interface unit further comprises a clock generator for generating and providing a clock signal to other units, and a frequency of the clock signal is 10MHz.

[c5] 5. The real-time data transmission interface of claim 1,

wherein the I/O unit comprises:

a control logic unit for controlling the I/O unit to perform a read/write operation according to an external control signal;

a checking circuit coupled to the control logic unit, wherein when a self test mode is activated, the control logic unit controls the checking circuit to check an accuracy of the data output from the I/O unit and to generate a checking result;

a data output latch coupled to the control logic unit, wherein when the nonreal-time data is transmitted via the I/O unit, the control logic unit controls the data output latch to latch the nonreal-time data, and determines whether to output the nonreal-time data; and

a data input latch coupled to the control logic unit, wherein when the real-time data is read via the I/O unit, the data input latch receives the real-time data.

[c6] 6. The real-time data transmission interface of claim 1,

wherein the memory unit comprises:

a control logic unit for controlling the memory unit according to an external control signal;

a first address counter coupled to the control logic unit for providing a first address;

a first memory coupled to the first address counter for storing the nonreal-time data;

a first buffer latch unit coupled to the first memory via an internal data bus for working as an input/output interface of the first memory;

a second address counter coupled to the control logic unit for providing a second address;

a second memory coupled to the second address counter for storing the real-time data; and

a second buffer latch unit coupled to the second memory via the internal data bus for working as an input/output interface of the second memory.

[c7] 7. The real-time data transmission interface of claim 6, wherein the memory unit further comprises a flag register for storing a flag state.

[c8] 8. The real-time data transmission interface of claim 1, wherein the network interface control unit comprises a programmable interface controller and a TTL/differential level converting interface, wherein the TTL/differential level converting interface is used to convert a type of the real-time data from TTL to differential or in reverse, and to cache the real-time data.

[c9] 9. The real-time data transmission interface of claim 8, wherein the programmable interface controller comprises:

a storage apparatus, wherein a microcode is stored in

the storage apparatus for controlling an operation of the programmable interface controller;
a sequencer coupled to the storage apparatus for running a microcode instruction and for adjusting a running order according to an external condition;
a condition selector coupled to the sequencer for caching the external condition, which is used by the sequencer for its determining;
an event/interrupt handler coupled to the storage apparatus for handling either an interrupt signal or an event;
a processor coupled to the storage apparatus for running the microcode instruction; and
a parity generating/checking apparatus for either generating a parity bit according to the real-time data output from the programmable interface counter or checking the parity bit of the real-time data input into the programmable interface controller.

- [c10] 10. A real-time data transmission system, comprising:
a host computer, wherein the host computer is operated based on a nonreal-time processing operating system;
a real-time signal processing apparatus for processing a real-time data; and
a data transmission circuit for connecting the host computer and the real-time signal processing apparatus, wherein the data transmission circuit receives a nonreal-

time data transmitted from the host computer, and transmits the nonreal-time data to the real-time signal processing apparatus in a way of simulating a real-time transmission, in addition, the data transmission circuit receives the real-time data transmitted from the real-time signal processing apparatus, and transmits the real-time data to the host computer in a way of simulating a nonreal-time transmission.

[c11] 11. The real-time data transmission system of claim 10, wherein the host computer has an application which is used to control an operation of the data transmission circuit.

[c12] 12. The real-time data transmission system of claim 10, wherein the data transmission circuit comprises:
a nonreal-time data interface unit coupled to the host computer, wherein the nonreal-time data interface unit is used as a data transmission interface between the host computer and the data transmission circuit, and the nonreal-time data interface unit provides a clock signal;
an I/O unit coupled to the nonreal-time data interface unit, wherein the I/O unit is used to latch the nonreal-time data on a data output bus, and to latch the real-time data on a data input bus;
a memory unit coupled to the I/O unit for storing the nonreal-time data and the real-time data; and

a network interface control unit coupled to the memory unit and the real-time signal processing apparatus, wherein the network interface control unit is used as a data transmission interface between the real-time signal processing apparatus and the data transmission circuit.

[c13] 13. The real-time data transmission system of claim 12, wherein the data is transmitted between the nonreal-time data interface unit and the host computer based on an ISA/PCI bus.

[c14] 14. The real-time data transmission system of claim 12, wherein the I/O unit comprises a first I/O port and a second I/O port, and the first I/O port stores a control word which is used to control the network interface control unit and transmits back a flag state to the host computer, in addition, the second I/O port writes the non-real-time data to the network interface control unit or reads the real-time data from the network interface control unit.

[c15] 15. The real-time data transmission system of claim 12, wherein the memory unit comprises a first memory and a second memory for storing the real-time data and the nonreal-time data.

[c16] 16. The real-time data transmission system of claim 12,

wherein the network interface control unit comprises a programmable interface controller and a TTL/differential level converting interface.

[c17] 17. The real-time data transmission system of claim 16, wherein the programmable interface controller is used to transmit data with the real-time signal processing apparatus in real-time.

[c18] 18. The real-time data transmission system of claim 16, wherein the TTL/differential level converting interface is used to convert a TTL type bus signal into a differential type bus signal.